DOCUMENT RESUME

ED 278 357 IR 012 451

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TITLE Computer Knowledge and Attitudes of Pre-Service Teachers in College Computer Education Courses.
PUB DATE [86]
NOTE 15p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Literacy; Correlation; Course Content; Higher Education; Longitudinal Studies; *Preservice Teacher Education; *Prior Learning; Statistical Distributions; *Student Attitudes
IDENTIFIERS *Texas Tech University

ABSTRACT

A study was conducted at Texas Tech University to determine whether significant changes had occurred in the entry level computer knowledge and attitudes of students enrolling in College of Education undergraduate computer literacy courses over a 3-year period, and to determine any implications such changes might have for planners of these courses. Undergraduate students (13 in fall 1984, 31 in spring 1985, and 170 in spring 1986) completed two questionnaires on previous computer experience and on the perceived importance of various computer uses, including tool applications, educational applications, and games. Frequency distributions were accumulated to determine the variation between experience levels and perceptions. Results over the 3 years showed: (1) no significant differences in the skills and attitudes of the students enrolling in this course; (2) no change in number having prior computing experience; and (3) a highly positive general student attitude toward computers throughout the study. This suggests that major changes in the content of the course are not warranted if based on changing skills and attitudes of students during the study. However, it can be expected that the entry level skills and attitudes of students enrolling in computer education courses will change over time, and further research is indicated to determine if and in what manner these changes develop. Four tables display the results of data analyses and the two questionnaires used in the study are appended. (DJR)

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Computer Knowledge and Attitudes of Pre-Service Teachers in College Computer Education Courses

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IR012451

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Computer Knowledge and Attitudes of Pre-Service Teachers

in College Computer Education Courses

Increased emphasis on the need for developing computer literate teachers has led to the widespread implementation of computer education in teacher education programs. Whether teaching with or about computers, teachers must be prepared with adequate knowledge of computer applications and have sufficient skills in using them. Therefore, many colleges, universities, and other agencies have begun the task of preparing computer literate teachers. Programs developed range from in-service training workshops and seminars to courses and degree programs for pre-service teachers. Descriptions of such programs are available throughout current literature. (Lee, 1983; Moore, 1984; Rogers, 1983; Stasz, 1984; Uhlig, 1982; Walla and Wendel, 1983) However, no sooner was computer education begun, than the needs and perceptions of the teachers and prospective teachers began to change. The purpose of this study was measure the knowledge and attitudes of pre-service teachers on topics related to computer education at a large state university, and to determine what implications these have for planners of computer education courses.

Texas was one of eight frontrunner states to implement an

instructional computing curriculum. (Anderson and Smith, 1984) Courses for in-service teachers are offered through the 20 Regional Education Service Centers in the state. Some school districts also offer extensive staff development programs. State colleges and universities are offering computer education courses at the undergraduate and graduate levels. The state requirements for teacher certification adopted by the State Board of Education in 1984, require a 3-hour course in "computer literacy" for teacher certification.

Texas Tech University offers introductory computer education courses at both the graduate and undergraduate levels. The undergraduate course is taught through both traditional lecture/presentation and lab experiences. The course is structured to provide a practical overall introduction to the world of educational computing and to allow opportunities for the students to learn through performing "hands-on" computer tasks.

Entry-level skills of students enrolling in the required computer literacy course for pre-service teachers is likely to change rapidly. As stated in a report entitled "Computer Education for Colleges of Education,"

> It should be recognized that the need for such a course (computer literacy) is temporal and

> will disappear as adequate instruction in this area is introduced at the pre-college level so that students entering college will have such a background. (Rogers, 1983)

Computer applications in the field of education are also changing rapidly. School uses of such tools as databases, electronic spreadsheets, word processors, CAI software and instructional management tools suggests the type of "literacy" most valuable and interesting to prospective teachers.

Purpose of the Study

The purpose of this study was to determine whether a significant difference exists in the entry level computer knowledge and attitudes of students enrolling in Texas Tech's College of Education undergraduate computer literacy course between the Fall semester 1984, and the Spring semester 1986.

Methods

Students enrolled in the undergraduate course completed two questionnaires. One concerned the amount and type of their computer experience. The other was a "Computer Values Survey." Both questionnaires are included in the Appendix to this article.

Frequency distributions were accumulated and statistical techniques applied to the responses to determine significance of

variation between experience levels and perceptions.

Results of the Study

The Chi-square technique was used to compare experience levels among the students enrolled in three semesters (Fall, 1984, Spring, 1985, and Spring, 1986). Computer experience was defined as having previously used a computer either in an educational, work, or home setting. Table 1 illustrates the values obtained.

Table 1

Semester	Computer Experience	No Computer Experience
Fall, 1984 N = 13	6 (46%)	7 (54%)
Spring, 1985 N = 31	11 (35%)	20 (65%)
Spring, 1986 N - 170	90 (53%)	80 (47%)

X^2 = 3,28 df = 2

NOTE: Extreme variation in N due to the "phasing in" of course requirements.

The results indicated the number of students with prior computer experience was not significantly higher in any of the semesters. The anticipated rapid increase in entry level computer skills had not yet materialized.

On the "Computer Values Survey," students prioritized eight applications areas of computer usage. Responses were rank ordered (1-highest to slowest) for each of the three semesters. Table 2 indicates the results.

Table 2

Application Area	Semester		
	Fall, '84	Spring, '85	Spring, '86
Copy Utilities	1	2	3
Educational Programs	2	6	1
Communications Utilities	3	2	2
Fantasy Games	4	7	7
Programming Utilities	5	4	4
Graphics Programs	6	1	6
Spreadsheets	7	5	5
Arcade-type Games	8	7	8

Correlations between the semesters were computed using the Spearman Rank Order technique. The correlation between the Fall, 1984 semester and the Spring, 1985 semester was .31. Correlation between Spring, 1985 and Spring, 1986 was .38. Neither of these values was significant. Correlation between Fall, 1984 and Spring, 1986 was .76, significant at the .05 level.

Although the variable accounting for the similar viewpoints was not identified, the correlation between Fall, 1984 and Spring, 1986 indicates students enrolled during those two

semesters held highly similar views concerning the importance of computer applications. Students enrolled in the Spring, 1985 differed from the other two semesters in their viewpoints concerning the priorities. This difference is indicated by the low priority placed on educational programs and the high priority of graphics programs compared to the levels of priority of the same applications areas in the other two semesters.

In order to apply the Chi-square technique to this data, the applications areas were grouped into three more general categories and responses from all three semesters were combined. Category 1 included arcade type games and fantasy games. Category 2 included communications utilities and educational programs. Category 3 included programming utilities, graphics programs, spread sheets, and copy utilities. Table 3 shows the results of this grouping for the combined semesters. The Chi-square value is significant at the .001 level.

Table 3

Category	Most Important	Least Important
1 - Games	154	334
2 - Communication/Educational Programs	335	89
3 - Programming/Graphics/ Spreadsheets	564	280

$X^2 = 244.63$ df = 2

Based on the data in Table 3, the students considered Category 3 applications as the highest in priority and Category 1 applications as the lowest priority. This suggests the students perceive the computer's most important role as that of a tool rather than an arcade game machine.

The "Computer Values Survey" also included eleven questions in which the respondent chose one of a pair of words used to describe computers. The pair choices are shown on the "Computer Values Survey" in the appendix. For analysis, five pairs indicating clearly delineated positive/negative perceptions were included. Table 4 shows the results of the Chi-square calculation for combined semesters. The Chi-square value is significant at the .001 level.

Table 4

Positive/Negative Pair	Positive Response	Negative Response
Friend/Foe	152	22
Savior/Threat	115	52
Pleasure/Pain	130	34
Solution/Puzzle	90	78
Messiah/Monster	94	55

$X^2 = 57.44$ df = 4

NOTE: Total number of Positive and Negative responses varies because some respondents did not make choices in all pairs.

This data suggests the students' attitudes toward computers are highly positive. In all five pairs of descriptive words, positive descriptions of the computer were chosen more frequently than negative.

Conclusion

The anticipated significant differences in skills and attitudes between students taking the course over the 2½ years time span of the study were not found. The number of students having prior computing experience did not change significantly, with roughly half of the students reporting some prior experience.

The attitude of the students also changed very little. All students viewed the 'tool' applications of computers as the most important, educational applications as second in importance, and games at least important. A highly positive general student attitude toward computers prevailed throughout the study.

This information suggests that major changes in the content of the course are not warranted if based on changing skills and attitudes of students during the study. However, as computers continue to permiate the home, school, and work environments, it can be logically expected that the entry level skills and attitudes of students enrolling in entry level computer education

courses will change over time. Further research is indicated to determine if and in what manner these changes develop.

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Appendix A

Computing Experience

Name: _____

PLEASE ANSWER THESE QUESTIONS AS COMPLETELY AS YOU CAN. BE SPECIFIC. THE INFORMATION YOU GIVE ME WILL HELP ME TO SET UP THE CLASS ACCORDING TO YOUR NEEDS AND PAST EXPERIENCES.

1. Why are you taking this class? What do you expect to learn from it?

2. After college, what type of work do you plan to do?

3. Can you type (not with two fingers!)? Yes No

   If yes, about how many words per minute? _____

4. Have you had any experience with computers: Yes No

   If yes, what did you do and what kind of equipment did you use?

5. Are any computers available to you outside of this class? Yes No

   If yes, what kind of computer is it? How often is it available to you?

6. Do you have any friends or relatives who work with computers? Yes No

Appendix B

Computer Values Survey

Please answer each question objectively. There are no right or wrong answers. This is not a test and it will not count on your grade.

AGE: SEX: M F CLASSIFICATION: F S J S

I. Rank Order

Prioritize the list of computer uses below in terms of their importance to you. 1 = least important to 6 = most important.

Computer Uses	Circle Your Choice
arcade type games	1 2 3 4 5 6
communications utilities	1 2 3 4 5 6
copy utilities	1 2 3 4 5 6
educational pgms-drills, tutorials, etc.	1 2 3 4 5 6
fantasy games	1 2 3 4 5 6
graphics/drawing pgms.	1 2 3 4 5 6
programming utilities	1 2 3 4 5 6
spreadsheets	1 2 3 4 5 6

II. Either/Or

Which is a computer more like?

1. friend or foe
2. hard or soft
3. threat or savior
4. male or female
5. pleasure or pain
6. puzzle or solution
7. work or hobby
8. person or machine
9. fire or ice
10. tool or resource
11. monster or messiah